AVX Tantalum Corporation
York County
Biddeford, Maine
A-664-71-E-R

Departmental
Findings of Fact and Order
Air Emission License

After review of the air emissions license application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

AVX Tantalum Corporation (AVX) located in Biddeford, Maine has applied to renew their Air Emission License permitting the operation of emission sources associated with their capacitor manufacturing facility.

B. Emission Equipment

The following equipment is addressed in this air emission license:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate (gal/hr)	Fuel Type, % sulfur	Stack #
Boiler #1	2.5	17.9	#2 fuel oil, 0.5%	38
Boiler #2	2.5	17.9	#2 fuel oil, 0.5%	49
Boiler #3	7.1	50.7	#2 fuel oil, 0.5%	37

Note: The boilers have been renumbered to reflect the current numbering system at AVX.

AVX has many different process operations but only a few groups of equipment have the potential to emit one ton/year or greater of any regulated pollutant. These processes are:

1. Pyrolysis Ovens
2. De-flash Machines
3. Miscellaneous Isopropanol Use
4. Silver Dip Process
5. Marking Operations

AVX also operates two solvent cleaning machines, a vapor degreaser and a cold cleaning degreaser. The cold cleaning degreaser uses "Crystal Simple Green", an aqueous surfactant, and is listed for inventory purposes only.

C. Application Classification

The application for AVX does not include the licensing of increased emissions or the installation of new or modified equipment. Therefore, the license is considered to be a renewal of current licensed emission units only and has been processed through Chapter 115 of the Department's regulations.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in Chapter 100 of the Department regulations. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for existing emissions equipment means that method which controls or reduces emissions to the lowest possible level considering:

- the existing state of technology;
- the effectiveness of available alternatives for reducing emissions from the source being considered; and
- the economic feasibility for the type of establishment involved.

B. Process Description

AVX manufactures tantalum capacitors. The core of the capacitor, known as the pellet, is formed in the pressing operation by compacting tantalum powder mixed with or without polyethylene-glycol binder around a thin wire electrode in die molds of various sizes. The pellet is rinsed in de-ionized water to remove the polyethylene glycol binder and hot air dried. The pellets are heated to fuse the powder into a more cohesive sintered structure. The sintering is conducted in an electric furnace which is evacuated and purged with helium a number or times prior to heating to prevent combustion of the tantalum. After cooling, the pellets are removed from the furnace, and a small Teflon washer is placed onto the wire electrode. The pellets are then tack-welded onto a stainless steel frame to facilitate handling through the remaining process operations. The frames are carefully heated to shrink-fit the Teflon washer to form a tight seal around the pellet electrode.

The next process is called "formation." The frames are lowered over dip trays, and the pellets are dipped in a solution of either dilute nitric, phosphoric, or sulfuric acid/ethylene glycol, and a current is impressed through the electrode. This causes an electrolytic reaction that forms a tantalum oxide coating on the pellets and imparts the desired electrical characteristics to the capacitor core. The pellets proceed to a manganese-nitrate/nitric acid solution and through a drying stage followed by a pyrolysis stage. In the pyrolysis stage steam is used to heat and react with the manganese nitrate/nitric acid. Following pyrolysis, the pellets go through a "healing" process in which they are dipped in dilute acetic acid or sulfuric acid/ethylene glycol rinses followed by additional heating to repair any minor cracks which may have formed during pyrolysis. The pellets are dipped in an aqueous slurry of carbon black with an ammonium-hydroxide buffer, then dried. The pellets proceed to the silver dip process where they are dipped in a slurry of metallic silver and high flash-point organic solvent. This completes the formation and manufacturing of the capacitor core.

In the remaining operations, highly automated machinery removes the pellet from the frame, welds the wire lead onto one side of the metal rail or "lead frame," and glues the pellet to the other end of the lead frame using conductive silver epoxy. The frame is then heated to cure the epoxy adhesive. The lead frames proceed to another automated machine which presses a thermo-set epoxy plastic material onto the frame. This serves as a mold to form the capacitor body. Once the capacitor bodies are removed from the molds, they proceed to "de-flashing" which is an abrasive blasting process to remove any surplus plastic material from the capacitor body. At this stage the capacitors are marked using highly transfer-efficient stamp-type labeling machines and packed for shipment.

Isopropanol is primarily used for drying capacitors used in medical implants and for some miscellaneous cleaning of process equipment. The product specifications for medical use require a cleaning stage using a sodium bicarbonate solution which is subsequently rinsed in de-ionized water. The capacitors are then placed in a 500 ml beaker of isopropanol and soaked for a specified time.

C. Boilers #1, #2, and #3

AVX operates three Boilers #1, #2, and #3 for facility process and heating needs.

Boilers #1, #2, and #3 each have a maximum heat input less than 10 MMBtu/hr and are therefore not subject to the New Source Performance Standards (NSPS) Subpart Dc for steam generating units greater than 10 MMBtu/hr manufactured after June 9, 1989.

A summary of the BPT analysis for Boilers #1 and #2 (2.5 MMBtu/hr each) and Boiler #3 (7.1 MMBtu/hr) is the following:

1. The total fuel use for the facility shall not exceed 400,000 gal/year of #2 fuel oil, based on a 12 month rolling total, with a maximum sulfur content not to exceed 0.5% by weight.
2. Chapter 106 regulates fuel sulfur content, however in this case a BPT analysis for SO_2 determined a more stringent limit of 0.5% was appropriate and shall be used.
3. Chapter 103 regulates PM emission limits for Boiler #3. The PM limits for Boilers #1 and #2 and the PM_{10} limits are derived from Chapter 103.
4. NO_x emission limits are based on data from similar #2 fired boilers of this size and age.
5. CO and VOC emission limits are based upon AP-42 data dated 9/98.
6. Visible emissions from the boilers shall each not exceed 20% opacity on a six (6) minute block average, except for no more than one (1) six (6) minute block average in a continuous 3-hour period.

D. Pyrolysis Ovens and Pre-dryers

The pyrolysis ovens and pre-dryers emit relatively small quantities of NO_x from the chemicals used in this process. Due to the relatively small amounts of NO_x produced by these units, no additional add-on NO_x controls are economically justified.

A summary of the BPT analysis for the pyrolysis ovens and pre-dryers is the following:

1. AVX shall operate the pyrolysis ovens and pre-dryers in accordance with the facility's written procedures and work practices.
2. AVX shall not exceed an annual NO_x emission limit of 11 ton/yr from the pyrolysis ovens and pre-dryers, based on a 12 month rolling total, demonstrated by recordkeeping including monthly records of chemical use.

E. De-flash Machines

The de-flash machines emit small quantities of particulate matter and are equipped with dust collectors rated at greater than 95% efficiency.

A summary of the BPT analysis for the de-flash machines is the following:

1. Particulate emissions from the de-flash machines shall be vented through dust collectors and the de-flash machines shall be maintained so as to prevent PM leaks.

2. Opacity from the de-flash machine exhausts shall not exceed 20% on a 6 minute block average basis, except for no more than 1 six minute block average in a 1 hour period.

F. VOCs

AVX uses small amounts of isopropanol for removing water from capacitors used in medical implants.

The silver dip process is not used to apply a "protective, decorative, or functional film." The silver deposition is one stage in the formation of the capacitor itself. Therefore, the Department has determined that the silver dip process does not meet the definition of coating and that this process is not subject to the requirements of Chapter 129. AVX will continue to track the monthly usage and emissions of VOC from the silver dip process to demonstrate compliance with the total license VOC limit.

The marking operations use approximately three gallons of ink per year and are therefore exempt from Chapter 129 in accordance with Chapter 129, Section 1.E.1, which exempts coating units using less than 50 gallons of coating per year.

A summary of the BPT analysis for facility VOC use is the following:

1. AVX shall not exceed an annual VOC emission limit of 10 ton/yr from process operations, based on a 12 month rolling total, demonstrated by recordkeeping including monthly records of VOC use.
2. AVX shall close all containers containing isopropanol when not in use.
3. AVX shall maintain monthly records of the total solvent used in the vapor degreaser.
4. The vapor degreaser shall be operated in accordance with Chapter 130.

G. Annual Emissions

AVX shall be restricted to the following annual emissions, based on a 12 month rolling total:

Total Licensed Annual Emission for the Facility
Tons/year
(used to calculate the annual license fee)

	PM	**PM_{10}**	**SO_2**	**NO_x**	**CO**	**VOC**
Boilers	3.4	3.4	14.1	8.4	1.0	0.1
Process	--	--	--	11.0	--	10.0
Total TPY	**3.4**	**3.4**	**14.1**	**19.4**	**1.0**	**10.1**

III. AMBIENT AIR QUALITY ANALYSIS

According to the Maine Regulations Chapter 115, the level of air quality analyses required for a renewal source shall be determined on a case-by case basis. Modeling and monitoring are not required for a renewal if the total emissions of any pollutant released do not exceed the following:

Pollutant	**Tons/Year**
PM	25
PM_{10}	25
SO_2	50
NO_x	100
CO	250

Based on the above total facility emissions, AVX is below the emissions level required for modeling and monitoring.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-664-71-E-R subject to the following conditions.

Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

STANDARD CONDITIONS

(1) Employees and authorized representatives of the Department shall be allowed access to the licensee's premises during business hours, or any time during which any emissions units are in operation, and at such other times as the Department deems necessary for the purpose of performing tests, collecting samples, conducting inspections, or examining and copying records relating to emissions (Title 38 MRSA §347-C).

(2) The licensee shall acquire a new or amended air emission license prior to commencing construction of a modification, unless specifically provided for in Chapter 115. [MEDEP Chapter 115]

(3) Approval to construct shall become invalid if the source has not commenced construction within eighteen (18) months after receipt of such approval or if construction is discontinued for a period of eighteen (18) months or more. The Department may extend this time period upon a satisfactory showing that an extension is justified, but may condition such extension upon a review of either the control technology analysis or the ambient air quality standards analysis, or both. [MEDEP Chapter 115]

(4) The licensee shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction, or operation which may result in fugitive dust, and shall submit a description of the program to the Department upon request. [MEDEP Chapter 115]

(5) The licensee shall pay the annual air emission license fee to the Department, calculated pursuant to Title 38 M.R.S.A. §353. [MEDEP Chapter 115]

(6) The license does not convey any property rights of any sort, or any exclusive privilege. [MEDEP Chapter 115]

(7) The licensee shall maintain and operate all emission units and air pollution systems required by the air emission license in a manner consistent with good air pollution control practice for minimizing emissions. [MEDEP Chapter 115]

(8) The licensee shall maintain sufficient records to accurately document compliance with emission standards and license conditions and shall maintain such records for a minimum of six (6) years. The records shall be submitted to the Department upon written request. [MEDEP Chapter 115]

(9) The licensee shall comply with all terms and conditions of the air emission license. The filing of an appeal by the licensee, the notification of planned

changes or anticipated noncompliance by the licensee, or the filing of an application by the licensee for a renewal of a license or amendment shall not stay any condition of the license. [MEDEP Chapter 115]

(10) The licensee may not use as a defense in an enforcement action that the disruption, cessation, or reduction of licensed operations would have been necessary in order to maintain compliance with the conditions of the air emission license. [MEDEP Chapter 115]

(11) In accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department, the licensee shall:

A. perform stack testing to demonstrate compliance with the applicable emission standards under circumstances representative of the facility's normal process and operating conditions:
   1. within sixty (60) calendar days of receipt of a notification to test from the Department or EPA, if visible emissions, equipment operating parameters, staff inspection, air monitoring or other cause indicate to the Department that equipment may be operating out of compliance with emission standards or license conditions; or
   2. pursuant to any other requirement of this license to perform stack testing.

B. install or make provisions to install test ports that meet the criteria of 40 CFR Part 60, Appendix A, and test platforms, if necessary, and other accommodations necessary to allow emission testing; and

C. submit a written report to the Department within thirty (30) days from date of test completion.

[MEDEP Chapter 115]

(12) If the results of a stack test performed under circumstances representative of the facility's normal process and operating conditions indicate emissions in excess of the applicable standards, then:

A. within thirty (30) days following receipt of such test results, the licensee shall re-test the non-complying emission source under circumstances representative of the facility's normal process and operating conditions and in accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department; and

B. the days of violation shall be presumed to include the date of stack test and each and every day of operation thereafter until compliance is demonstrated under normal and representative process and operating conditions, except to the extent that the facility can prove to the satisfaction of the Department that there were intervening days during which no violation occurred or that the violation was not continuing in nature; and

C. the licensee may, upon the approval of the Department following the successful demonstration of compliance at alternative load conditions, operate

under such alternative load conditions on an interim basis prior to a demonstration of compliance under normal and representative process and operating conditions.

[MEDEP Chapter 115]

(13) Notwithstanding any other provisions in the State Implementation Plan approved by the EPA or Section 114(a) of the CAA, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any statute, regulation, or Part 70 license requirement. [MEDEP Chapter 115]

(14) The licensee shall maintain records of malfunctions, failures, downtime, and any other similar change in operation of air pollution control systems or the emissions unit itself that would affect emission and that is not consistent with the terms and conditions of the air emission license. The licensee shall notify the Department within two (2) days or the next state working day, whichever is later, of such occasions where such changes result in an increase of emissions. The licensee shall report all excess emissions in the units of the applicable emission limitation. [MEDEP Chapter 115]

(15) Upon written request from the Department, the licensee shall establish and maintain such records, make such reports, install, use and maintain such monitoring equipment, sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such a manner as the Department shall prescribe), and provide other information as the Department may reasonably require to determine the licensee's compliance status. [MEDEP Chapter 115]

SPECIFIC CONDITIONS

(16) **Boilers**

A. Total fuel use for the boilers shall not exceed 400,000 gal/yr of #2 fuel oil with a maximum sulfur content not to exceed 0.5% by weight. Compliance shall be demonstrated by fuel records from the supplier showing the quantity of fuel delivered and the percent sulfur of the fuel. Records of annual fuel use shall be kept on a 12-month rolling total basis. [MEDEP Chapter 115, BPT]

B. Emissions shall not exceed the following:

Emission Unit	Pollutant	lb/MMBtu	Origin and Authority
Boiler #3	PM	0.12	MEDEP, Chapter 103, Section 2(B)(1)(a)

C. Emissions shall not exceed the following [MEDEP Chapter 115, BPT]:

Emission Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Boiler #1	0.30	0.30	1.26	0.75	0.09	0.01
Boiler #2	0.30	0.30	1.26	0.75	0.09	0.01
Boiler #3	0.85	0.85	3.58	2.13	0.25	0.02

D. Visible emissions from the boilers shall each not exceed 20% opacity on a six (6) minute block average, except for no more than one (1) six (6) minute block average in a continuous 3-hour period. [MEDEP Chapter 101]

(17) **Pyrolysis Ovens and Pre-dryers**

A. AVX shall operate the pyrolysis ovens and pre-dryers in accordance with the facility's written procedures and work practices. [MEDEP Chapter 115, BPT]

B. AVX shall not exceed an annual NO_x emission limit of 11.0 ton/yr from the pyrolysis ovens and pre-dryers, based on a 12 month rolling total, demonstrated by recordkeeping including monthly records of chemical use. [MEDEP Chapter 115, BPT]

(18) **De-flash Machines**

A. Particulate emissions from the de-flash machines shall be vented through dust collectors and the de-flash machines shall be maintained so as to prevent PM leaks. [MEDEP Chapter 115, BPT]

B. Opacity from the de-flash machine exhausts shall not exceed 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 1 hour period. [MEDEP Chapter 101]

(19) **Facility Wide VOC Use**

A. AVX shall not exceed an annual VOC emission limit of 10.0 ton/yr from process operations, based on a 12 month rolling total, demonstrated by recordkeeping including monthly records of VOC use. [MEDEP Chapter 115, BPT]

B. AVX shall close all containers containing isopropanol when not in use. [MEDEP Chapter 115, BPT]

C. AVX shall maintain monthly records of the total solvent used in the vapor degreaser. [MEDEP Chapter 115, BPT]

(20) AVX may add or remove equipment from the pyrolysis, pre-drying, or de-flash operations as long as the installation or removal of the components does not result in noncompliance with any terms of the emission license or any representations made in the air emission license application. [MEDEP Chapter 115, BPT]

(21) **Vapor Degreaser**

The vapor degreaser at AVX is subject to MEDEP Chapter 130 and AVX shall comply with all applicable operating and record keeping requirements of MEDEP Chapter 130. [MEDEP Chapter130]

(22) AVX shall notify the Department within 48 hours and submit a report to the Department on a quarterly basis if a malfunction or breakdown in any component causes a violation of any emission standard (Title 38 MRSA §605).

(23) **Payment of Annual License Fee**
AVX shall pay the annual air emission license fee within 30 days of May 31st of each year. Pursuant to 38 MRSA §353-A, failure to pay this annual fee in the stated timeframe is sufficient grounds for revocation of the license under 38 MRSA §341-D, subsection 3.

DONE AND DATED IN AUGUSTA, MAINE THIS DAY OF 2006.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:_____
DAVID P. LITTELL, COMMISSIONER

The term of this license shall be five (5) years from the signature date above.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 1/30/06
Date of application acceptance: 2/13/06

Date filed with the Board of Environmental Protection: _____

This Order prepared by Lynn Ross, Bureau of Air Quality.